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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/653,509	09/02/2003	Tao He	042933/268393	3893

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ALSTON & BIRD LLP
BANK OF AMERICA PLAZA
101 SOUTH TRYON STREET, SUITE 4000
CHARLOTTE, NC 28280-4000

EXAMINER	
PATHAK, SUDHANSHU C	

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 12/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/653,509	HE ET AL.	
	Examiner	Art Unit	
	Sudhanshu C. Pathak	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Sept. 2nd, 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *Sept. 2nd, 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-to-24 are pending in the application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 3-10 (method) & 11, 13-20 & 21-24 (system) are rejected under 35 U.S.C. 103(a) as being unpatentable over Kansakoski et al. (6,570,909) in view of Huang et al. (6,067,292).

In regards to Claim 1, Kansakoski discloses a method of reducing interference within a local channel signal received during operation of a mobile station in at least one of an idle state and an access state (Abstract, lines 1-4, 8-12 & Column 1, lines 25-33 & Column 2, lines 11-19, 41-46 & Column 3, lines 5-10 & Column 4, lines 4-11 & Fig. 1) {Interpretation: The reference discloses a method for interference cancellation, and thus reducing interference within a pilot channel. The reference further discloses that the pilot channel is transmitted by the base station and is received by the mobile station. The reference further discloses that the pilot signal is transmitted continuously and therefore the interference cancellation is performed during the idle state and the access state}, the method comprising: selecting at least one interfering pilot channel signal that has a signal strength, wherein the

selected at least one interfering pilot channel signal comprises an interfering set of pilot channel signals (Abstract, lines 8-12 & Column 1, lines 30-33 & Column 3, 13-16 & Column 2, lines 11-20, 40-46 & Column 4, lines 4-11 & Fig. 1, element "RX") {Interpretation: The reference discloses selecting the signals based on signal strength, wherein the interference channel are defined as a channel which is not of interest and further comprises multipath signals. The reference also specifically discloses an interference signal further as a signal with an interfering pn code and further multipath signals i.e. groups of interfering signals}. The reference discloses canceling the pilot channel interference from the pilot channel itself i.e. this is interpreted as interference cancellation from a pilot channel wherein the interference is a different pilot channel and multipath interference signals}; and producing a corrected local channel signal based upon the interfering set of pilot channel signals during the at least one of the idle state and the access state (Column 4, lines 12-15 & Column 6, lines 14-16 & Fig. 1, element(s) 22-32). However, Kansakoski does not explicitly disclose selecting the interfering pilot signal that has signal strength above a threshold.

Huang discloses a spread spectrum receiver for canceling interference from a received signal (Abstract, lines 1-2), wherein the cancellation is based on the detected signal level (Abstract, lines 10-12). Huang further discloses performing the interference cancellation based on the signal strength exceeding a certain power threshold (Column 14, lines 30-45). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the

invention that Huang discloses performing interference cancellation if the signal strength is above a threshold so as to avoid performing the cancellation of signals already severely degraded without any benefit to the BER, and increasing the complexity of the receiver and reducing the speed at which the data is received.

In regards to Claims 3 & 13, Kansakoski in view of Huang discloses a method of reducing interference as described above. Kansakoski further discloses the local channel signal is received in a receiver including a rake receiver having at least a first finger assigned to the local channel signal and a second finger assigned to one of the interfering set of pilot channel signals (Column 3, lines 5-17, 61-67 & Column 4, lines 1-15 & Column 6, lines 14-16 & Fig. 1, elements 10-20, 22-32), and wherein producing a corrected local channel signal comprises: producing an interference signal based on a despreading sequence associated with the first finger, and a pilot channel pseudonoise (pn) sequence corresponding to the second finger, wherein producing the interference signal comprises correlating the despreading sequence with the pilot channel pn sequence (Fig. 2, element 104 & Column 5, lines 29-40 & Column 6, lines 7-10); producing a correction signal corresponding to the first finger based on the interference signal and a received pilot signal corresponding to the second finger (Fig. 2, element 120, 72 & Column 4, lines 34-43) {Interpretation: The reference discloses the correction signal to be the output of the multiplier "120" as disclosed in Fig. 2}; and subtracting the correction signal from the local channel signal to produce

a corrected local channel signal (Fig. 2, element 130, 102 & Column 6, lines 14-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention.

In regards to Claims 4-5 & 14-15 & 22-23, Kansakoski in view of Huang discloses a method of reducing interference as described above. Kansakoski further discloses the first finger and the second finger are two fingers of n fingers of the rake receiver (Column 1, lines 65-67), wherein each finger is assigned to one of the local channel signal and a pilot channel signal from the interfering set of pilot channel signals (Fig. 1 & Column 2, lines 11-20 & Column 3, lines 5-35 & Column 4, lines 4-12) {Interpretation: The reference discloses assigning fingers to six strongest multipath signals including interference signals and the desired signal}, wherein producing a corrected local channel signal further comprises: producing n-1 interference signals corresponding to the first finger, each interference signal of the n-1 interference signals based on the despreading sequence associated with the first finger, and one of n-1 pilot channel pn sequences corresponding to the n fingers excluding the first finger (Fig. 2, elements 104-112 & Abstract, lines 8-12 & Column 2, lines 1-4 & Column 5, lines 29-41 & Column 6, lines 8-10 & Claim 4, lines 3-8) {Interpretation: The reference discloses cancellation correlators (104-112 of Fig. 2) produces the interference signals, wherein the reference discloses "5" interference signals wherein the reference discloses "6" fingers}; and producing n-1 correction signals corresponding to the first finger, each correction signal based on each interference signal of the n-1

interference signals and a received pilot channel signal corresponding to one of n fingers other than the first finger (Fig. 2, elements 120-128 & Column 2, lines 27-40 & Column 6, lines 8-13 & Claim 4, lines 9-13), and wherein subtracting the correction signal comprises subtracting the n-1 correction signals from the local channel signal to produce the corrected local channel signal (Fig. 2, element 130 & Column 6, lines 14-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Claim 4 is a sub set of claim 5 wherein n = 3.

In regards to Claims 6 & 16 & 24, Kansakoski in view of Huang discloses a method of reducing interference as described above. Kansakoski further discloses producing a group of n-1 interference signals, n-1 correction signals and further producing a corrected local channel signal (Fig. 1, elements 10-20, 34-44 & Fig. 2) {Interpretation: The reference discloses all the elements as described in Fig. 2 are in each of the n fingers}. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention.

In regards to Claims 7 & 17, Kansakoski in view of Huang discloses a method of reducing interference as described above. Kansakoski further discloses interpolating a value of a pilot channel pseudonoise (pn) sequence corresponding to the second finger to produce a pilot channel pn sequence corresponding to the second finger (Fig. 1, element 36 & Fig. 2, element 118 & Claim 1, lines 6-8 & Claim 6, lines 3-4) {Interpretation: The reference

discloses interpolating a value of a pilot channel pn sequence}; and digitally filtering the pilot channel pn sequence with a digital filter, the digital filter having an impulse response in accordance with a function equal to the convolution of an input impulse response of an input filter to the receiver and an output impulse response of a transmitter filter of a transmitter transmitting the pilot channel signal of the interfering set of pilot channel signals (Fig. 2, element 118 & Claim 6) {Interpretation: The impulse response in accordance to the transmitter filter of the transmitter transmitting the received signal in this case the pilot channel or the data channel}. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention.

In regards to Claims 8 & 18, Kansakoski in view of Huang discloses a method of reducing interference as described above. Kansakoski further discloses producing an interference signal comprises correlating the despreading sequence with the pilot channel pn sequence after the pilot channel pn sequence has been filtered in the digital filter (Fig. 2, element 46, 50, 104 & Fig. 1, elements 34-44, 46-56) {Interpretation: The reference discloses the cancellation circuit for each fingers (Fig. 1, elements 34-44) wherein each of the cancellation circuit includes multiple correlators (Fig. 2, elements 104-112) wherein the input into the corrrelators includes a pilot channel pn sequence after it has been filtered in the digital filter (Fig. 2, elements 118, 46-56) wherein the filtered signals are provided from each finger (Fig. 1, elements 48-56)}. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention.

In regards to Claims 9 & 19, Kansakoski in view of Huang discloses a method of reducing interference as described above. Kansakoski further discloses producing the correction signal comprises multiplying the interference signal with the received pilot signal corresponding to the second finger (Fig. 1, element 72, 34 & Fig. 2, element 120, 72). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention.

In regards to Claims 10 & 20, Kansakoski in view of Huang discloses a method of reducing interference as described above. Kansakoski further discloses producing a correction signal corresponding to the first finger comprises multiplying the interference signal and the received pilot signal (Fig. 1, element 72, 34 & Fig. 2, element 120, 72). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention.

In regards to Claim 11, Kansakoski discloses a system for reducing interference within a local channel signal received during operation of the system in at least one of an idle state and an access state (Abstract, lines 1-4, 8-12 & Column 1, lines 25-33 & Column 2, lines 11-19, 41-46 & Column 3, lines 5-10 & Column 4, lines 4-11 & Fig. 1) {Interpretation: The reference discloses a system for interference cancellation, and thus reducing interference within a pilot channel. The reference further discloses that the pilot signal is transmitted continuously and therefore the interference cancellation is performed during the idle state and the access state}, the system comprising: a selector for selecting at least one interfering pilot

channel signal that has a signal strength, wherein the selected at least one interfering pilot channel signal comprises an interfering set of pilot channel signals (Abstract, lines 8-12 & Column 1, lines 30-33 & Column 3, 13-16 & Column 2, lines 11-20, 40-46 & Column 4, lines 4-11 & Fig. 1, element "RX") {Interpretation: The reference discloses selecting the signals based on signal strength, more specifically six strongest multipath signals, wherein the interference channel are defined as a channel which is not of interest and further comprises multipath signals. The reference discloses canceling the pilot channel interference from the pilot channel itself i.e. this is interpreted as interference cancellation from a pilot channel wherein the interference is a different pilot channel and multipath interference signals}; and a finger demodulator assembly capable of producing a corrected local channel signal based upon the interfering set of pilot channel signals during the at least one of the idle state and the access state (Column 3, lines 11-17, 61-67 & Column 4, lines 12-15 & Column 6, lines 14-16 & Fig. 1, elements 10-20, 22-32). However, Kansakoski does not explicitly disclose a controller implementing a selector for selecting at least one interfering pilot channel signal wherein selecting the interfering pilot signal that has signal strength above a threshold.

Huang discloses a spread spectrum receiver for canceling interference from a received signal (Abstract, lines 1-2), wherein the cancellation is based on the detected signal level (Abstract, lines 10-12). Huang further discloses performing the interference cancellation based on the signal strength exceeding a certain power threshold (Column 14, lines 30-45) wherein the

controller is disclosed so as to performing the selection process (Fig. 2, elements 208-209 & Fig. 3, elements 303-304, 320). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Huang discloses performing interference cancellation if the signal strength is above a threshold so as to avoid performing the cancellation of signals already severely degraded without any benefit to the BER, and increasing the complexity of the receiver and reducing the speed at which the data is received. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Huang teaches implementing the selection process in a controller and this is implemented in the system as described in Kansakoski so as to be able to implement the threshold in software so as to be able to vary the threshold depending on channel conditions.

In regards to Claim 21, Kansakoski discloses a system for reducing interference within a local channel signal received during operation of the system in at least one of an idle state and an access state (Abstract, lines 1-4, 8-12 & Column 1, lines 25-33 & Column 2, lines 11-19, 41-46 & Column 3, lines 5-10 & Column 4, lines 4-11 & Fig. 1) {Interpretation: The reference discloses a system for interference cancellation, and thus reducing interference within a pilot channel. The reference further discloses that the pilot signal is transmitted continuously and therefore the interference cancellation is performed during the idle state and the access state}, the system comprising: a selector for selecting at least one interfering pilot

channel signal that has a signal strength, wherein the selected at least one interfering pilot channel signal comprises an interfering set of pilot channel signals (Abstract, lines 8-12 & Column 1, lines 30-33 & Column 3, 13-16 & Column 2, lines 11-20, 40-46 & Column 4, lines 4-11 & Fig. 1, element "RX") {Interpretation: The reference discloses selecting the signals based on signal strength, more specifically six strongest multipath signals, wherein the interference channel are defined as a channel which is not of interest and further comprises multipath signals. The reference discloses canceling the pilot channel interference from the pilot channel itself i.e. this is interpreted as interference cancellation from a pilot channel wherein the interference is a different pilot channel and multipath interference signals}; and a finger demodulator assembly (rake receiver) comprising: a first finger assigned to the local channel signal; and a second finger assigned to one of the interfering set of pilot channel signals (Column 3, lines 5-17, 61-67 & Column 4, lines 1-15 & Column 6, lines 14-16 & Fig. 1, elements 10-20, 22-32) comprising noise reduction element associated with the first finger (Fig. 1, element 34) {Interpretation: The reference discloses a rake receiver wherein the fingers are assigned to the desired signal and the interference signals depending on the signal strength}, wherein the noise reduction element comprises: a correlator adapted to correlate an interpolated pilot channel pseudonoise (pn) sequence corresponding to the second finger with a despreading sequence corresponding to the first finger to produce an interference signal (Column 2, lines 19-26 & Column 5, lines 57-67 & Column

6, lines 1-10 & Fig. 2, elements 118, 104); a multiplier adapted to multiply the interference signal with a received pilot signal corresponding to the second finger to produce a correction signal (Fig. 2, element 120 & Column 6, lines 8-13); and a subtractor adapted to subtract the correction signal from the local channel signal to produce a corrected local channel signal(Fig. 2, element 130 & Column 6, lines 14-20). However, Kansakoski does not explicitly disclose a controller implementing a selector for selecting at least one interfering pilot channel signal wherein selecting the interfering pilot signal that has signal strength above a threshold.

Huang discloses a spread spectrum receiver for canceling interference from a received signal (Abstract, lines 1-2), wherein the cancellation is based on the detected signal level (Abstract, lines 10-12). Huang further discloses performing the interference cancellation based on the signal strength exceeding a certain power threshold (Column 14, lines 30-45) wherein the controller is disclosed so as to performing the selection process (Fig. 2, elements 208-209 & Fig. 3, elements 303-304, 320). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Huang discloses performing interference cancellation if the signal strength is above a threshold so as to avoid performing the cancellation of signals already severely degraded without any benefit to the BER, and increasing the complexity of the receiver and reducing the speed at which the data is received. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Huang teaches implementing the

selection process in a controller and this is implemented in the system as described in Kansakoski so as to be able to implement the threshold in software so as to be able to vary the threshold depending on channel conditions.

4. Claims 2 (method) & 12 (system), are rejected under 35 U.S.C. 103(a) as being unpatentable over Kansakoski et al. (6,570,909) in view of Huang et al. (6,067,292) and in further view of Applicant Admitted Prior Art (AAPA).

In regards to Claims 2 & 12, Kansakoski in view of Huang discloses a method of reducing interference as described above. Kansakoski further discloses selecting at least one interfering pilot channel signal and producing a corrected local channel signal (Abstract, lines 8-12 & Column 1, lines 30-33 & Column 3, 13-16 & Column 2, lines 11-20, 40-46 & Column 4, lines 4-15 & Fig. 1, element "RX" & Column 6, lines 14-16 & Fig. 1, element(s) 22-32, 34-44) {Interpretation: The reference discloses selecting the signals based on signal strength, more specifically six strongest multipath signals, wherein the interference channel are defined as a channel which is not of interest i.e. signal with an interfering pn code, and further comprises multipath signals wherein the desired signal is the locally generated pn code}. However, Kansakoski does not explicitly disclose selecting the interfering pilot signal by comparing the interference signal to a threshold, and furthermore, performing the process of selecting and comparing is performed repeatedly.

Huang discloses a spread spectrum receiver for canceling interference from a received signal (Abstract, lines 1-2), wherein the cancellation is based

on the detected signal level (Abstract, lines 10-12). Huang further discloses performing the interference cancellation based on the signal strength exceeding a certain power threshold (Column 14, lines 30-45) {Interpretation: The process of comparing is inherent so as to determine if the signal strength exceeds a threshold} wherein the controller is disclosed so as to performing the selection process (Fig. 2, elements 208-209 & Fig. 3, elements 303-304, 320) {Interpretation: Only the signals that exceed a threshold are selected, therefore it is inherent that if the signals that do not exceed the threshold are removed}. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Huang discloses performing interference cancellation if the signal strength is above a threshold so as to avoid performing the cancellation of signals already severely degraded without any benefit to the BER, and increasing the complexity of the receiver and reducing the speed at which the data is received. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Huang teaches implementing the selection process in a controller and this is implemented in the system as described in Kansakoski so as to be able to implement the threshold in software so as to be able to vary the threshold depending on channel conditions. However, Kansakoski in view of Huang does not disclose performing the process of selecting and comparing is performed repeatedly.

AAPA discloses a mobile station performing the process of continuously determining the base station to which it is connected to, as moves through a

communication system (Specification, Page 2, lines 17-20) {Interpretation: The reference discloses a process, by the mobile station, of determining the base station for communication is provided so as to determine the stronger pilot channels, therefore the process of comparing and selecting is performed repeatedly}. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that AAPA teaches performing the process of selecting and comparing is performed repeatedly and this is performed in the method as described in Kansakoski in view of Huang so as to be able to determine the interfering signals and perform interference cancellation as the environment of the mobile station changes and further be able to perform hand-off to a neighbor cell. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the fingers in the receiver are limited (six-in the Kansakoski reference) and wherein selecting the six strongest signal strengths would require repeatedly comparing and selecting.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure, it is recommended to the applicant to amend all the claims so as to be patentable over the cited prior art of record. A detailed list of pertinent references is included with this Office Action (See Attached "Notice of References Cited" (PTO-892)).
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose

telephone number is (571)-272-3038. The examiner can normally be reached on M-F: 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh M. Fan can be reached on (571)-272-3042.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Sudhanshu C. Pathak
Examiner
Art Unit 2611